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(54) **PRINTING MACHINE**

(57) The printing machine is designed to print different polygraphic matter without replacement of the printing form upon transition from printing one publication to another.

The machine comprises a printing form in the form of a mesh, all the cells of which are filled with ink, and means for selectively forcing the ink through the mesh cells by means of a quantum-mechanical oscillator light beam.

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## Description

The present invention relates to printing devices. More concretely, the invention relates to means for printing different polygraphic matter, both simple and highly artistic.

### Background Art

Printing machines are known comprising a printing form in the form of a stencil applied on a mesh, means for applying ink onto the form and means for forcing the ink through through cells of the stencil and carrying it to the surface of the material being imprinted. In the known machine, disclosed in Japanese application No. 55-34970, class B41M 1/12, published 11 March 1980, No. 53-108988, the printing form is made in the form of a mesh covered with a layer of light-sensitive emulsion which upon exposition through a photoform under the effect of UV radiation is hardened on the space portions to be filled. The unhardened portions of the emulsion are washed off. The hardened emulsion is subjected to setting by thermal treatment and is covered with a special composition to protect it against acids or alkalis. In the process of printing, ink is applied to the form, the ink being forced through the open cells of the mesh by a doctor blade and is transferred to the paper. After the printing is finished, the hardened layer is removed from the mesh, which is again covered with a light-sensitive emulsion to prepare the next stencil.

A disadvantage of such machines is the necessity of making and setting up a printing form in order to print each run. This process is not only lengthy per se. The fashion in present-day polygraphy is characterized by small runs of the publications, as a result of which the time necessary to prepare a machine for operation becomes comparable with the time spent on printing, i.e. expensive equipment is used ineffectively.

### Disclosure of the Invention

At the base of the invention lies the object of creating a printing machine which immediately after finishing printing a preceding publication could begin printing a subsequent publication without replacement of the printing form.

This object is achieved in that a printing form is made in the form of a mesh, all the cells of which are filled with ink, and means for selectively forcing ink through the cells of the mesh is made in the form of a quantum-mechanical oscillator of a light beam, with a device for focusing it to the size of a cell of the mesh and with a device for deflecting that beam over the rows of its cells.

With such an execution of the machine, the beam of the quantum-mechanical oscillator, in accordance with a program, knocks out drops of ink from corresponding cells of the mesh onto paper, and since the ink is

applied to all the cells of the mesh of the form in each cycle of printing, there is no need to replace the form in the machine which operates according to a program directly from the computer.

It is advisable that the quantum-mechanical oscillator of the light beam be provided with a beam diameter modulator in order to expand, in accordance with the program, the zone of mesh cells which are simultaneously covered by the beam.

Such a realization of the machine makes it possible to obtain polygraphic matter with a wide range of color gradation.

It is also advisable that the printing machine be provided with means for forcefully cleansing the mesh cells of the form of ink not transferred onto the surface of the material being imprinted after completion of one deflection cycle of the light beam.

Such a realization of the machine eliminates overfilling of the mesh cells of the form, which are not used in one printing cycle, with ink.

### Brief Description of the Drawings

The invention will now be explained by a description of concrete embodiments, which do not limit the instant invention, and the accompanying drawings, in which:

Fig. 1 shows a printing machine schematically;  
Fig. 2 shows a fragment of a mesh with cells from which the ink has been forced out by the beam of a quantum-mechanical oscillator.

### Best Methods of Carrying Out the Invention

As shown in Fig. 1, the proposed printing machine comprises a form cylinder 1, made in the form of a mesh with cells 2, and a printing cylinder 3, between which a paper sheet 4 moves. The form cylinder 1 is linked by means of rolls 5 and 6 to a vessel 7 containing ink. A slot nozzle 8, through which compressed air is supplied, is disposed inside the cylinder 1. A means 9 for selectively forcing ink through the cells 2 of the mesh is also disposed inside the cylinder 1. This means is made in the form of a quantum-mechanical oscillator 10 of a light beam 11 with a beam diameter modulator 12, with a device 13 for focusing the beam 11 to the size of a mesh cell and with a device 14 for deflecting that beam along the rows of cells 2.

The proposed printing machine operates in the following manner.

By means of a drive (not shown in the drawing), the form cylinder 1, the printing cylinder 3, the rolls 5, 6 rotate in the direction shown by the arrows, the paper sheet 4 moves and air is forced into the nozzle 8. By means of rolls 5 and 6, ink is applied in a uniform thin layer from the vessel 7 onto the mesh of the form cylinder 1, filling its cells 2. The light beam 11 of the quantum-mechanical oscillator 10 is focused, deflected in a

horizontal plane along the row of cells 2 of the mesh of the form cylinder 1 and, in accordance with a program, knocks ink out of corresponding cells of the mesh in each of its rows, the ink being transferred to the paper sheet 4. The knocking out of the ink takes place in accordance with the discovery of the "light-hydraulic effect" (Diploma No. 65, BI No. 19, 1969), wherein when there is absorption of a quantum-mechanical oscillator light beam in a liquid, impact momentum occurs. A fragment of the mesh of the form cylinder 1, from the cells 2 of which ink has been knocked out, is shown in Fig. 2. The cells 2 of the form cylinder 1, from which ink is not transferred to the sheet 4 after passage through the zone of deflection of the light beam 11, are forcefully freed of ink by blowing compressed air from the nozzle 8 through them.

The shape of the proposed printing machine is not necessarily cylindrical. It can also be, for example, flat and execute reciprocal motion relative to the beam being deflected transverse thereto.

The form can also be stationary, and the quantum-mechanical oscillator beam may be deflected over the whole field thereof.

The proposed printing machine can also print multi-colored matter. In order to do this it should comprise several of the printing sections described above, and the paper sheet 4 will be sequentially passed between cylinders 1 and 3 of those sections.

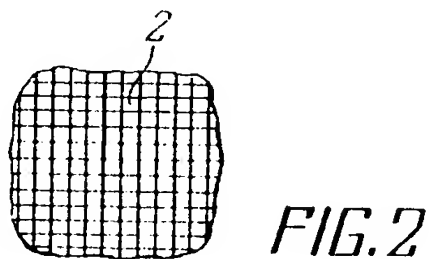
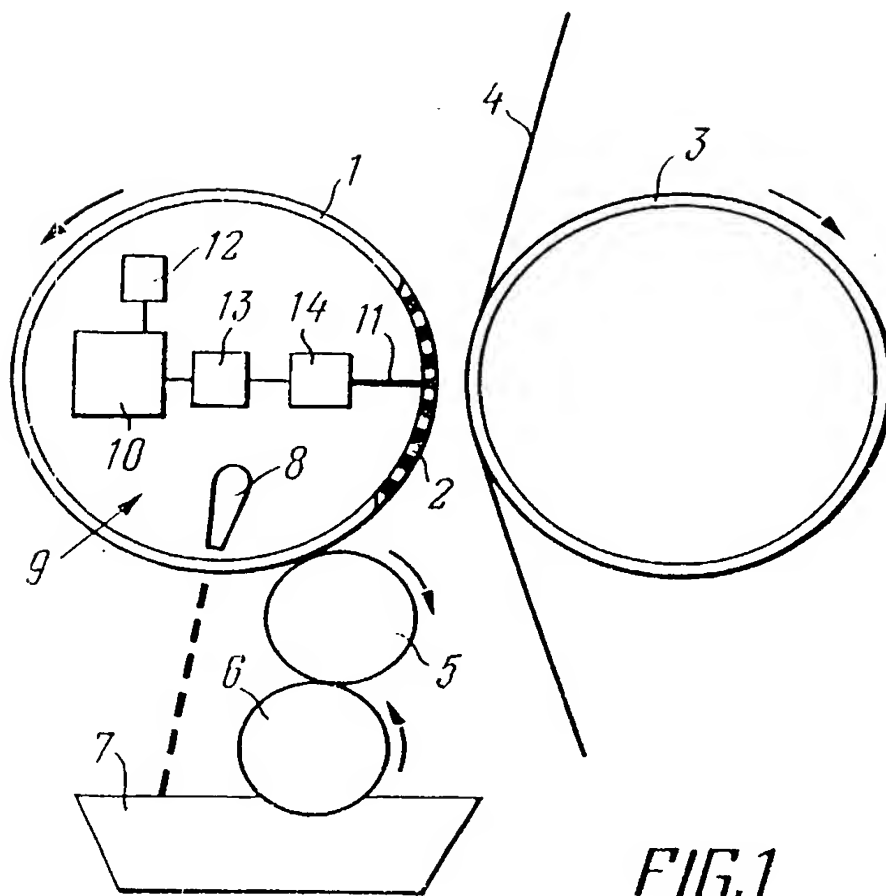
#### Industrial Applicability

The printing machine is designed to print different polygraphic matter, both simple and highly artistic.

#### Claims

1. A printing machine comprising a printing form in the form of a stencil applied on a mesh, a means for applying ink onto the form and a means for forcing the ink through through cells of the stencil and carrying it onto the surface of the material being imprinted, characterized in that the printing form is made in the form of a mesh, all the cells of which are filled with ink, and means for selectively forcing ink through cells of the mesh is made in the form of a quantum-mechanical oscillator of a light beam with a device for focusing it to the size of a mesh cell and a device for deflecting that beam along the rows of cells.
2. A printing machine according to claim 1, characterized in that the light beam quantum-mechanical oscillator is provided with a beam diameter modulator to widen the zone of mesh cells simultaneously covered.
3. A printing machine according to claim 1, characterized in that it is provided with means for forcefully

cleansing the mesh cells of the form of ink not transferred to the surface of the material being imprinted after completion of one deflection cycle of the light beam.



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/RU 96/00152

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC <sup>6</sup> : B41F 15/08, 15/40//B41M 1/12 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC <sup>6</sup> : B41F 15/00, 15/08, B41M 1/12		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SU, A, 121802 (FEDOTOV A.M.), 1959	1
A	SU, A1, 1535742 (OMSKY POLITEKHNICHESKY INSTITUT), 15 January 1990 (15.01.90)	1
A	FR, A1, 2452380 (FRANCAISE D'ASSEMBLAGE MECANIQUE ET D'ETANCHEITE FRAMET), 24 October 1980 (24.10.80)	1
A, P	WO, A3, 95/18020 (CAMORANI, Carlo, Antonio et al), 06 July 1995 (06.07.95)	1
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<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reasons (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search 10 July 1996 (10.07.96)		Date of mailing of the international search report 17 July 1996 (17.07.96)
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